Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Parts 2, 25, and 73 of the	)	
Commission's Rules to Implement Decisions	)	
from the World Radiocommunication Conference	)	ET Docket No 04-139
(Geneva, 2003) (WRC-03) Concerning Frequency	)	
Bands Between 5900 kHz and 27.5 GHz and to	)	
Otherwise Update the Rules in this Frequency	)	
Range	)	

NOTICE OF PROPOSED RULEMAKING

Adopted: March 29, 2004 **Released: March 31, 2004**

Comment Date: 30 days from date of publication in the Federal Register.
Reply Comment Date: 45 days from date of publication in the Federal Register.

By the Commission:

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I. INTRODUCTION

1 By this action, we propose to amend Parts 2, 25, and 73 of our Rules to complete the domestic implementation of allocation decisions from the World Radiocommunication Conference (Geneva, 2003) (WRC-03) concerning the frequency bands between 5900 kHz and 27 5 GHz and to otherwise update our Rules in this frequency range.[1] The following proposals are the most significant to non-Federal Government operations:

- Authorize single sideband (SSB) and digital transmissions in the frequency bands between 5900-26100 kHz that are allocated to the high-frequency broadcasting (HFBC) service, which is also known as international or shortwave broadcasting.
- Realign the allocations near 7 MHz to (1) upgrade secondary allocations for the mobile service in bands 6765-7000 kHz and 7400-8100 kHz to primary allocations for the mobile except aeronautical mobile route (R) service,[2] and (2) reallocate the band 7350-7400 kHz to the HFBC service.[3]
- Conform the provisional Little LEO feeder link allocations (uplinks at 1390-1392 MHz and downlinks at 1430-1432 MHz) to the *WRC-03 Final Acts*, that is, downgrade these allocations from primary to secondary status.
- Allocate the band 5000-5010 MHz to the radionavigation-satellite service (RNSS) and limit the use of this allocation to Earth-to-space transmissions (RNSS (Earth-to-space) or RNSS uplinks) on a primary basis for Federal and non-Federal Government use.
- Allocate the band 5010-5030 MHz to the RNSS and limit the use of this allocation to space-to-Earth transmissions (RNSS downlinks) and satellite-to-satellite transmissions (RNSS (space-to-space)) on a primary basis for Federal and non-Federal Government use
- Replace the secondary non-Federal Government allocation to the Earth exploration-satellite service (EESS) in the band 25.25-27.5 GHz that is limited to satellite-to-satellite transmissions with the broader inter-satellite service (ISS) allocation, but maintain its secondary status
- Upgrade the secondary non-Federal Government allocation to the EESS (space-to-Earth) in the band 25.5-27 GHz to primary status

2. At the request of the National Telecommunications and Information Administration (NTIA), we propose the following allocation changes for Federal Government operations, which involve spectrum primarily used by the Federal Government [4]

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[1] *See* ITU *World Radiocommunication Conference Final Acts (Geneva, 2003) (WRC-2003 Final Acts)*. The *WRC-03 Final Acts* shall enter into force on January 1, 2005, except as specified in ITU Radio Regulation No. 59 8. *See WRC-03 Final Acts*, Article 59 at Nos. 59.7 and 59.8.

[2] Aeronautical mobile (R) service is defined as an aeronautical mobile service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes 47 C.F.R. § 2 1. Thus, a mobile except aeronautical mobile (R) service allocation permits all mobile service uses except for this very specialized use

[3] The 7 MHz realignment also provides an additional 100 kilohertz of global primary spectrum for the amateur service at 7100-7200 kHz This allocation has long been implemented in the United States. Nonetheless, this action may increase spectrum efficiency See paras 22-31, especially para 30.

[4] The Commission, which is an independent agency, administers non-Federal Government spectrum and NTIA, which is an operating unit of the Department of Commerce, administers Federal Government spectrum. 47 C.F.R. § 2 105(a) NTIA also approves the spectrum needs of new systems for use by Federal departments and agencies and maintains the Federal Government Table of Frequency Allocations in its *Manual of Regulations and Procedures for Federal Radio Frequency Management (NTIA Manual)*

- Raise the secondary radiolocation service allocation in the band 2900-3100 MHz to primary status
- Move the space research service (SRS) (deep space) (Earth-to-space) allocation in the band 7145-7190 MHz from a footnote to the body of the Federal Government Table of Frequency Allocations (Federal Government Table) (table entry) and make explicit that this allocation has primary status
- Upgrade the secondary SRS allocation in the band 14.8-15 35 GHz to primary status
- Allocate the band 25 5-27 GHz to the SRS (space-to-Earth) on a primary basis
- Allocate the band 432-438 MHz to the EESS (active) on a secondary basis for use mainly outside of the United States

These actions would conform our Rules to the *WRC-03 Final Acts* and are expected to provide significant benefits to the American public

II. BACKGROUND

3 In January 2001, the Commission established the World Radiocommunication Conference Advisory Committee (WRC-03 Advisory Committee) to assist it in the development of proposals for WRC-03 Consistent with the Federal Advisory Committee Act, membership in the WRC-03 Advisory Committee was open to anyone

4. In November 2002, the Conference Preparatory Meeting (CPM) finalized a report to WRC-03.[5] The *Report from CPM to WRC-03* represented the best information on technical, operational, and regulatory/procedural issues relevant to the WRC-03 agenda at the time of its preparation and was used as the basis for the discussions at the Conference.

5 On January 8, 2003, the WRC-03 Advisory Committee finalized its recommendations and forwarded them to the Commission for our consideration In addition, NTIA submitted letters to the Commission containing draft proposals that had been developed by the Executive Branch agencies By public notice, the Commission requested comment on these recommendations and draft proposals.[6] The *U S Proposals for WRC-03* that resulted for this open public process made proposals for many of the items on the WRC-03 agenda to address interests of Federal and non-Federal Government entities.[7] In addition, the United States worked with other administrations in Region 2[8] to craft Inter-American Proposals[9]

[5] *See Report from CPM to WRC-03* This document can be downloaded from the ITU web site at http //www.itu int/md/meetingdoc asp?type=sitems&lang=e&parent=R00-CPM-SP-0001

[6] *See Public Notice* entitled "The FCC's Advisory Committee for the 2003 World Radiocommunication Conference Approves Draft Proposals," DA 03-91, released January 15, 2003

[7] *See United States of America Proposals for the Work of the Conference*, plenary meeting, Document_E, dated February 9, 2003 (*U S Proposals for WRC-03*), *United States of America Proposals for the Work of the Conference*, plenary meeting, Agenda Item 1 16, Document 38-E, April 28, 2003

[8] The ITU divides the world into three geographic Regions. The United States is in Region 2, which includes North and South America. Region 1 is primarily Africa, Europe, the former Soviet Union, and the Middle East Region 3 is primarily the remainder of Asia, Australia, and New Zealand. *See* 47 C F R. § 2 104 for the official definitions and map of the three ITU Regions

[9] *See* Organization of American States, Inter-American Telecommunications Commission (CITEL), Inter-American Proposals for WRC-03, Parts 1, 2, and 3, dated April 21, 2003

6 The International Telecommunication Union (ITU), under the auspices of the United Nations, convened WRC-03 from June 9 to July 4, 2003, in Geneva, Switzerland with over 140 countries participating WRC-2003 considered 48 conference agenda items concerning the deployment, growth and evolving use of a broad range of spectrum-based services The allocation changes adopted by WRC-03 directly impact Federal and non-Federal Government use of the radio spectrum. The actions taken at WRC-03 were published as the *WRC-03 Final Acts* and these actions will subsequently be codified in the ITU *Radio Regulations*.[10] We reflect the Table of Frequency Allocations, which is located in Article 5 of the ITU *Radio Regulations*,[11] in the first three columns of Section 2.106 of the Commission's Rules as the International Table of Frequency Allocations (International Table).[12]

7 Since July 4, 2003, we have taken several actions with regards to domestic implementation of the *WRC-03 Final Acts*. Specifically, we have (1) allocated the band 108-117.975 MHz to differential global positioning system (DGPS)[13] stations for the specific purpose of transmitting DGPS information intended for aircraft navigation;[14] (2) broadened the secondary land mobile-satellite service allocation in the band 14-14.5 GHz to a generic mobile-satellite service (MSS) allocation;[15] (3) made numerous allocation changes in the frequency range 5150-5725 MHz, including making 255 megahertz of spectrum available for U-NII devices;[16] (4) made proposals for earth stations on board vessels (ESVs),[17] and (5) finalized the V-band allocations [18]

[10] Specifically, the *WRC-2003 Final Acts* make changes to the ITU *Radio Regulations*, Edition of 2001.

[11] *See* ITU *Radio Regulations*, Article 5 (Frequency allocations), Section IV (Table of Frequency Allocations)

[12] 47C F.R. § 2 106 The International Table is subdivided into the Region 1 Table (column 1), the Region 2 Table (column 2), and the Region 3 Table (column 3), and is included in the Commission's Rules for informational purposes only The International Table is described in 47 C.F.R § 2 104

[13] DGPS allows the user to correct for GPS errors and to increase the overall accuracy of the GPS receiver. With DGPS, one GPS receiver is placed at a known location and the position information from that receiver is used to calculate corrections in the position data transmitted by the satellites This corrected information is then transmitted to other GPS receivers in the area. The resulting real-time accuracy is in the 10-meter range. Sub-meter accuracy can be obtained by using an additional DGPS and post-processing calculations in static positioning. *See* http://www magellangps.com/en/support/products/faqs/faq_gps.asp

[14] *Review of Part 87 of the Commission's Rules Concerning the Aviation Radio Service*, WT Docket No 01-289, *Report and Order and Further Notice of Proposed Rule Making*, 18 FCC Rcd 21432 (2003) (*Aviation R&O*) at para. 85. We also authorized DGPS stations to operate in the band 1559-1610 MHz.

[15] *Amendment of Parts 2, 25, and 87 of the Commission's Rules to Implement Decisions from World Radiocommunication Conferences Concerning Frequency Bands Between 28 MHz and 36 GHz and to Otherwise Update the Rules in this Frequency Range*; and *Amendment of Parts 2 and 25 of the Commission's Rules to Allocate Spectrum For Government and Non-Government Use in the Radionavigation-Satellite Service*, ET Docket No. 02-305 and RM-10331, *Report and Order*, 18 FCC Rcd 23426 (2003) (*Above 28 MHz R&O*).

[16] *Revision of Parts 2 and 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz band*, ET Docket No. 03-122, *Report and Order*, 18 FCC Rcd 24484 (2003) (*5 GHz R&O*)

[17] *Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14 0-14 5 GHz/11 7-12 2 GHz Bands*, IB Docket No. 02-10, *Notice of Proposed Rule Making*, 18 FCC Rcd 25248 (2003).

[18] *Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37 5-38.5 GHz, 40.5-41 5 GHz and 48 2-50 2 GHz Frequency Bands, Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40 5-42.5 GHz Frequency Band, Allocation of Spectrum in the 46 9-47 0 GHz Frequency Band for Wireless Services, and* (continued .)

8 On January 27, 2004, NTIA on behalf of the Executive Branch agencies, forwarded its recommendations for the national implementation of the results from WRC-03 [19] On February 20, 2004, NTIA supplemented its WRC-03 Recommendations by addressing the EESS (active) at 432-438 MHz [20] In this Notice of Proposed Rule Making (Omnibus NPRM), we consider all remaining allocation changes that were made at WRC-03 [21]

III. DISCUSSION

A. International Broadcast Stations

9 *Background* International broadcast stations transmit on certain frequencies between 5900 kHz and 26100 kHz.[22] These stations can be received at great distances because their signals bounce off the ionosphere and rebound to Earth, often thousands of miles from their origination. Numerous factors affect the reception of these transmissions, including the time of day, climate, and atmospheric noise, as well as co-channel and adjacent channel interference from other international broadcast stations around the world. Unlike other broadcasting services where a licensee broadcasts on the same frequency at all times, international broadcasters are assigned frequencies in several bands and vary their transmitter frequency on a seasonal basis to account for changes in propagation conditions, changing programming needs, and interference conditions. The United States participates in international frequency coordination meetings to reduce potential harmful interference to and from foreign HF broadcasts

10 Most international broadcast stations are operated by national governments. However, HFBC programs originating in the United States are provided by both Government and privately operated stations [23] The Commission licenses international broadcast stations to private entities under Part 73,

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(continued from previous page)
Allocation of Spectrum in the 37 0-38 0 GHz and 40 0-40 5 GHz for Government Operations, IB Docket No 97-95, *Second Report and Order*, 18 FCC Rcd 25428 (2003) (*V-band Second R&O*)

[19] *See* NTIA Letter from Fredrick R Wentland, Associate Administrator, Office of Spectrum Management, NTIA, United States Department of Commerce, to Edmond J Thomas, Chief, Office of Engineering and Technology (OET), FCC, dated January 27, 2004 (NTIA WRC-03 Recommendations)

[20] *See* NTIA Letter from Fredrick R Wentland, Associate Administrator, Office of Spectrum Management, NTIA, United States Department of Commerce, to Edmond J Thomas, Chief, OET, FCC, dated February 20, 2004.

[21] WRC-03 allocated the band 14-14 5 GHz to the MSS (Earth-to-space) on a secondary basis throughout the world We have recently implemented this WRC-03 allocation by broadening the non-Federal Government secondary allocation for the land mobile-satellite service (Earth-to-space) in the band 14-14 5 GHz to a MSS uplink allocation, while maintaining its secondary status (MSS encompasses the land mobile-satellite service, the maritime mobile-satellite service, and the aeronautical mobile-satellite service (AMSS).) *Above 28 MHz R&O* at paras 72-78. Boeing has filed a petition for rule making concerning the use of the AMSS portion of this allocation. In its WRC-03 Recommendations, NTIA requests that aircraft earth stations operating in the band 14-14.5 GHz be required to protect existing and future stations of the space research service in the band 14-14 2 GHz and of the radio astronomy service in the band 14 47-14.5 GHz In RM-10800, the Commission is considering service rules for AMSS use of the band 14-14 5 GHz We believe it more appropriate to consider NTIA's requested protection of incumbent services in the band 14-14 5 GHz in that proceeding and therefore, will address this request in that future allocation and service rule proceeding

[22] 47 C F R § 73 701(a)

[23] All U S Government and government sponsored, non-military, international broadcasting has been consolidated under the Broadcasting Board of Governors (BBG) BBG's HF broadcasters are Radio Farda, Radio Free Asia, Radio Free Europe/Radio Liberty, Radio Marti, Radio Sawa, and the Voice of America For more information, *see* http //www bbg gov/index cfm.

Subpart F of its Rules.[24] At present, there are 27 private sector licensees that are authorized to operate 67 HFBC transmitters [25] While these private sector licensees may operate on either a commercial or a non-profit basis, most operate on a non-profit basis.

11 Currently, 2930 kilohertz of spectrum in eight HF frequency bands is allocated to the broadcasting service on a primary, exclusive basis throughout the world [26] These bands are listed in the first column of Table 1, below. In addition, the band 7100-7300 kHz is allocated to the broadcasting service on a primary, exclusive basis in ITU Regions 1 and 3.[27] Consistent with the outcome of WARC-92, the U S allocated effective April 1, 2007, an additional 790 kilohertz of spectrum in ten frequency bands on a primary, exclusive basis to the HFBC service (WARC-92 HFBC bands).[28] These bands are listed in the second column of Table 1, below At WRC-03, certain HFBC allocations were changed as part of a realignment at 7 MHz, which is discussed in detail in the next section. For completeness, the 7 MHz realignment is included in the second, third, and fourth columns in Table 1, below, in brackets.

[24] 47 C F.R. Part 73, Subpart F--International Broadcast Stations

[25] *See* http //ftp.fcc.gov/ib/sand/neg/hf_web/stations.html.

[26] On the condition that harmful interference is not caused to the broadcasting service, fixed stations communicating within national borders may continue to use frequencies in the bands 9775-9900 kHz, 11650-11700 kHz, and 11975-12050 kHz 47 C F R § 2 106, footnotes 5.147 and US367

[27] In Region 2, the band 7100-7300 kHz is allocated to the amateur service on a primary basis, but its use "shall not impose constraints on the broadcasting service intended for use within Region 1 and Region 3." 47 C F.R. § 2 106, footnote 5.142

[28] At the World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (Malaga-Torremolinos, 1992) (WARC-92), an additional 790 kilohertz of spectrum in ten frequency bands (WARC-92 HFBC bands) were reallocated from the fixed and mobile services to HFBC, effective until April 1, 2007 Until that date, the WARC-92 HFBC bands are allocated to the HFBC, fixed, and mobile services on a co-primary basis After that date, on the condition that harmful interference is not caused to HFBC, fixed stations communicating within national borders may continue to use frequencies in the WARC-92 HFBC bands. 47 C.F R. § 2.106, footnotes 5.136, 5 143, 5.146, 5.151, and US366 *See Amendment of Parts 2, 73, 74, 80, 90, and 97 of the Commission's Rules to Implement Decisions from World Radiocommunication Conferences Concerning Frequency Bands Below 28000 kHz*, ET Docket No. 02-16, *Report and Order*, 18 FCC Rcd 3423 (2003) at paras. 11-15.

Table 1: Exclusive International HFBC Allocations			
8 existing bands that are allocated exclusively to HFBC on a worldwide basis	10 WARC-92 HFBC bands, which become effective on April 1, 2007, and WRC-03 HFBC allocation changes, which are shown in brackets	Transition plan footnotes	10 bands that will be allocated exclusively to HFBC on a world-wide basis after March 29, 2009
5950-6200 kHz	5900-5950 kHz	US366	5900-6200 kHz
[7100-7300 kHz in Regions 1 and 3]	[At WRC-03, 7100-7200 kHz was reallocated to the amateur service]	[5 141C, 5 142]	[Only 7200-7300 kHz in Regions 1 and 3 after March 29, 2009]
	7300-7350 kHz	USyyy	
	[At WRC-03, 7350-7400 kHz was allocated on a worldwide basis to the HFBC on a co-primary basis with the fixed and land mobile services]	[5 143A, 5 143B 5.143D]	[7300-7350 kHz expanded to 7300-7400 kHz]
	[At WRC-03, 7400-7450 kHz was allocated to the HFBC on a co-primary basis with the fixed and land mobile services in Regions 1 & 3]	[5 143A, 5 143B]	[7400-7450 kHz becomes an exclusive HFBC band in Regions 1 and 3 on March 29, 2009]
9500-9900 kHz	9400-9500 kHz	US366	9400-9900 kHz
11650-12050 kHz	11600-11650 & 12050-12100 kHz	US366	11600-12100 kHz
13600-13800 kHz	13570-13600 & 13800-13870 kHz	US366	13570-13870 kHz
15100-15600 kHz	15600-15800 kHz	US366	15100-15800 kHz
17550-17900 kHz	17480-17550 kHz	US366	17480-17900 kHz
	18900-19020 kHz	US366	18900-19020 kHz
21450-21850 kHz	No change	N/A	21450-21850 kHz
25670-26100 kHz	No change	N/A	25670-26100 kHz
2930 kilohertz allocated exclusively to HFBC throughout the world, with an additional 200 kilohertz allocated only in Regions 1 and 3	An additional 790 kilohertz is allocated exclusively to the HFBC service throughout the world on April 1, 2007, at which time the exclusive HFBC global spectrum totals 3720 kilohertz, with an additional 200 kilohertz allocated only in Regions 1 and 3		Additional 50 kilohertz allocated exclusively to HFBC on March 29, 2009, at which time the exclusive HFBC spectrum totals 3770 kilohertz, with additional 150 kilohertz allocated only in Regions 1 and 3

12. Prior to WRC-03, footnote 5.134 stated that the use of the WARC-92 HFBC bands was limited to SSB[29] with the characteristics specified in Appendix 11[30] or any other spectrum-efficient modulation techniques recommended by the ITU's Radiocommunication Sector (ITU-R). That is, traditional double sideband (DSB) transmissions were to be prohibited in the WARC-92 HFBC bands. However, the prohibition on DSB transmissions in the WARC-92 HFBC bands was removed at WRC-03. Specifically, footnote 5 134 was modified to read as follows:[31]

[29] DSB transmitters transmit the carrier frequency and both sidebands resulting from the modulation of the carrier by the modulating signal Traditionally, double sideband (DSB) emissions have been used in HF broadcasting. In contrast, SSB transmission is the method of operation in which one sideband is transmitted and the other sideband is suppressed; the carrier wave may be either transmitted or suppressed. *See The New IEEE Standard Dictionary of Electrical and Electronics Terms*, Fifth Edition.

[30] *See WRC-03 Final Acts*, Appendix 11 (Rev WRC-03) (System specifications for double-sideband (DSB), single-sideband (SSB) and digitally modulated emissions in the HF broadcasting service).

[31] WRC-97 adopted Article 12 as a simple and flexible seasonal planning procedure for HFBC based on coordination *See Final Acts* of the World Radiocommunication Conference (Geneva, 1997) (WRC-97), Article 12 *See also* ITU *Radio Regulations*, Article 12 (Seasonal planning of the HF bands allocated to the broadcasting service between 5900 kHz and 26100 kHz)

> 5 134 The use of the bands 5900-5950 kHz, 7300-7350 kHz, 9400-9500 kHz, 11600-11650 kHz, 12050-12100 kHz, 13570-13600 kHz, 13800-13870 kHz, 15600-15800 kHz, 17480-17550 kHz and 18900-19020 kHz by the broadcasting service as from 1 April 2007 is subject to the application of the procedure of Article 12 Administrations are urged to use these bands to facilitate the introduction of digitally modulated emissions in accordance with the provisions of Resolution 517 (Rev WRC-03)

13. In Resolution 517, WRC-03 resolved that digitally modulated and SSB emissions must comply with the characteristics specified in relevant parts of Appendix 11.[32] Also, in Resolution 517, WRC-03 resolved that whenever an administration replaces a DSB emission with an emission using digital or SSB modulation techniques, it shall ensure that the level of interference is not greater than that caused by the original DSB emission [33]

14. WRC-03 also amended Article 23 (Broadcasting Services) by revising No. 23.12 to read as follows:

> Transmitting stations of the broadcasting service operating in the HF bands allocated to the broadcasting service, except the bands as referred to in No. 23.6, shall meet the system specifications contained in Appendix 11.[34]

Thus, all U.S.-licensed international broadcasters are required to meet the system specifications contained in Appendix 11 of the ITU *Radio Regulations*. Appendix 11 describes the system specifications for DSB, SSB, and digitally modulated emissions in the HFBC bands. In general, Appendix 11 establishes minimum technical standards that enhance spectrum sharing. We note, however, that our rules do not currently provide for SSB or digital operations nor do our Rules for DSB operations mirror the Appendix 11 requirements.

15. WRC-03 also invited administrations to encourage the inclusion of digital modulation capability in all new HFBC transmitters put into service after January 1, 2004.[35] Recently, the ITU approved the use of the Digital Radio Mondiale (DRM) standard for broadcasting use in frequency bands below 30 MHz and some international broadcasters have begun DRM transmissions.[36]

16. At the request of the Broadcasting Board of Governors (BBG), NTIA recommends that footnote 5.134 be added to the United States Table of Frequency Allocations (U.S. Table).[37] In ET Docket No. 02-161, BBG stated that when the conditions of use in footnote 5.134 were first developed at

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[32] *See WRC-03 Final Acts*, Resolution 517 (Rev WRC-03) (Introduction of digitally modulated and single-sideband emissions in the high-frequency bands between 5900 kHz and 26100 kHz allocated to the broadcasting services), *resolves* 2 *See also WRC-03 Final Acts*, Appendix 11 (Rev.WRC-03) (System specifications for double-sideband (DSB), single-sideband (SSB) and digitally modulated emissions in the HF broadcasting service).

[33] *See WRC-03 Final Acts*, Resolution 517 (Rev.WRC-03), *resolves* 3.

[34] *See WRC-03 Final Acts*, Article 23, No 23.12 ITU Radio Regulation No. 23.6 refers to broadcasting in the Tropical Zone, which is a type of broadcasting for internal national use in countries in the tropics. While the southernmost potions of the Continental United States and Hawaii are within the Tropical Zone, the Commission has not implemented this limited service

[35] *See WRC-03 Final Acts*, Resolution 517

[36] *See* Draft New Recommendation ITU-R BS.[Doc 6/379], document 6/BL/3-E, dated August 21, 2003. The DRM standard is more precisely IEC Standard 62272-1, which is available in electronic form at ITU website· http.//www itu.int/md/choice_md asp?id=R00-WP6E-C-0284!P1!ZIP-E&lang=e&type=sitems.

[37] 47 C.F.R § 2.106. The U.S Table is described in 47 C F.R § 2.105.

WARC-92, the notion of making these frequency bands available only for SSB use was provisionally acceptable if periodic surveys indicated appropriate SSB receiver availability.[38] By WRC-97, BBG stated that it became obvious that digital radio development would eclipse SSB in terms of efficient use of HFBC spectrum. WRC-97 therefore modified footnote 5 134 to include digital types of modulation in addition to SSB, but DSB use was still restricted. Prior to WRC-03, BBG stated that international broadcasters still had not adopted SSB techniques and an ITU report demonstrated extremely limited availability of SSB receivers. Consequently, because of the continued reliance on DSB, the BBG actively sought the flexibility to use DSB in the WARC-92 HFBC bands as part of the United States' preparation for WRC-03. Finally, BBG stated that only when footnote 5.134 is modified to include DSB use in the WARC-92 bands will it satisfactorily meet the needs of international broadcasters, and only then should it be implemented.

17 *Proposal* As indicated above, prior to WRC-03, footnote 5.134 had prohibited traditional DSB transmissions in the WARC-92 HFBC bands. WRC-03 modified footnote 5 134 to be more flexible to meet the needs of international broadcasters in that it permits the continued use of DSB transmissions as well as SSB in the WARC-92 HFBC bands as HF broadcasters transition to digital technology. Accordingly, we propose to add modified footnote 5.134 to the U.S. Table Similar to the requirements in all other HFBC bands, this action would require the use of seasonal planning for the WARC-92 HFBC bands, which is codified in Article 12 of the ITU *Radio Regulations*

18. Modified footnote 5.134 urges use of the WARC-92 HFBC bands to facilitate the introduction of digitally modulated emissions in accordance with the provisions of revised Resolution 517. To ensure that HF broadcasters have sufficient flexibility, we therefore propose to update the Commission's Rules for international broadcast stations, which are codified in Part 73, Subpart F, to allow for SSB and digital transmissions in the HFBC bands.[39] Specifically, so that there is no ambiguity regarding the rules with which HF broadcasters must comply, we propose to add to our rules the ITU requirements for DSB, SSB, and digital HFBC systems, which are listed in revised Appendix 11 of the ITU *Radio Regulations*. The specific language of our proposal is presented in Appendix A, Section 73 756.

19 The effect of these proposals would be to grant U.S.-licensed international broadcast stations the flexibility to continue to transmit analog DSB signals or to transmit SSB or digital signals, including DRM signals (currently the only ITU-recommended digital standard for use in HFBC bands), which would allow international broadcast stations to provide FM-like sound quality to listeners in foreign countries. Nonetheless, we request comment on whether the DRM standard should be required for digital transmissions. We observe that broadcasting, unlike many other radiocommunication services, is a mass media service and that for such a service, standards are often useful.

20. Currently, Section 73 751 of the Commission's Rules states that no international broadcast station will be authorized to install, or be licensed for operation of, transmitter equipment with a rated carrier power of less than 50 kilowatts (kW).[40] The technical basis of this rule is that, given frequency congestion, an international broadcast station using DSB modulation needs to transmit with an output power of at least 50 kW in order to provide a signal that is strong enough to be received with low cost HFBC radios. We have previously waived this Rule in order to authorize licensees to operate SSB transmitters with 50 kW peak envelope power (PEP) because this power provides approximately the same

[38] *See* letter from John O Wood, BBG IRAC Representative, to Bruce A Franca, Acting Chief, Office of Engineering and Technology, FCC, dated November 30, 2001, in ET Docket No. 02-161

[39] 47 C.F.R. Part 73, Subpart F (International Broadcast Stations)

[40] 47 C F.R. § 73 751 (Operating power)

coverage area (even though this power is equivalent to only 15-20 kW relative to a DSB transmitter). Likewise, one of the advantages of digital transmission is that a lower rated transmitter output power can serve the same geographic area as a higher power analog signal One expert from a transmitter manufacturer has averred that an average power of 20 kW for DRM transmissions would provide approximately the same coverage as our Rule currently requires. Accordingly, we propose to revise Section 73 751 to codify these minimum operating powers for SSB and digital systems See Appendix A for the proposed language for revised Section 73 751

21. We request comment on all of the above proposals. In addition, we request comment on other needed changes to our Rules for international broadcast stations that are in compliance with ITU or other international standards. In particular, we ask whether our Rules should require the inclusion of the capability to offer digital modulation in all new HFBC transmitters put into service after the effective date of the Report and Order in this proceeding

B 7 MHz Realignment

22. *Background* The band 7000-7100 kHz is allocated to the amateur and amateur-satellite services on a primary, exclusive basis throughout the world [41] Further, the band 7100-7300 kHz is allocated to the amateur service on a primary, exclusive basis in Region 2, including the United States. Prior to WRC-03, the band 7100-7300 kHz was allocated exclusively to the HFBC service in Regions 1 and 3. Thus, for the amateur service, the usefulness of allocations around 7 MHz for worldwide links was limited because only 100 kilohertz of spectrum (7000-7100 kHz) was common to Regions 1, 2, and 3 In addition, because HF broadcasters are permitted to use much higher power than amateur radio operators, HFBC transmissions originating in Regions 1 and 3 could cause interference to the sensitive receivers used in the amateur service during periods of good propagation between those Regions and Region 2.[42]

23 At WRC-03, the worldwide amateur service allocation was expanded by 100 kilohertz by reallocating the band 7100-7200 kHz from the HFBC service in Regions 1 and 3 to the amateur service on a primary basis. However, until March 29, 2009, the band 7100-7200 kHz remains allocated to the HFBC service on a primary basis in Regions 1 and 3 [43] Moreover, until that date, amateur use of the band 7100-7200 MHz in Region 2 must not impose constraints on the HFBC service in Regions 1 and 3.[44]

24. Also at WRC-03, the worldwide HFBC service allocation was expanded by 50 kilohertz by reallocating the band 7350-7400 kHz from the fixed and land mobile services to the HFBC service on a primary basis. However, until March 29, 2009, the band 7350-7400 kHz remains allocated to the fixed service on a primary basis and to the land mobile service on a secondary basis throughout the world.[45]

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[41] The amateur service is a radiocommunication service for the purposes of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest. 47 C F R § 2.1 (Definitions) The amateur radio service is regulated under Part 97 of the Commission's Rules 47 C.F.R Part 97

[42] The operating power for international broadcast stations must be at least 50 kW (carrier power) 47 C.F.R § 73 751. Worldwide, most international broadcast stations transmit at least 100 kW, and there are a significant number of stations that transmit at 500 kW. In contrast, amateur stations are limited to 1.5 kW PEP, except that in certain frequency bands, amateur stations are more limited in power For example, amateur stations are limited to 200 W PEP in the segment 7100-7150 MHz and in the segment 7050-7075 kHz, when the station is within ITU Regions 1 and 3 47 C F.R § 97.313

[43] Appendix A, footnote 5 141C

[44] Appendix A, footnote 5.142

[45] Appendix A, footnotes 5 143A, 5.143B, and 5 143D

With regard to Region 2, the transition plan for these services is codified in footnote 5 143D, which would permit fixed and land mobile services to continue communicating within the United States and its insular areas after March 29, 2009, on the condition that harmful interference is not caused to HFBC [46]

25 WRC-03 also upgraded the secondary land mobile service allocations in the bands 6765-7000 kHz (footnote 5.138A) and 7400-8100 kHz (footnote 5 143E) to primary mobile except aeronautical mobile (R) service allocations, effective March 29, 2009 These generic mobile allocations, in conjunction with the existing primary fixed service allocations in these bands, will allow greater flexibility and also facilitate the use of frequency adaptive techniques,[47] thereby leading to greater efficiency in the use of the spectrum

26 *Proposal* We generally propose to implement the WRC-03 realignment at 7 MHz. However, in some cases we propose exceptions. First, we propose to upgrade the secondary mobile service allocation in the bands 6765-7000 kHz and 7400-8100 kHz to primary allocations for the mobile except aeronautical mobile (R) service. This action would give licensees increased flexibility and would facilitate adaptive techniques, which together with automation techniques, would reduce the burden on the operator while making these mobile service radios more responsive to changing HF propagation conditions. However, because the band 6765-7000 kHz is allocated to the broader mobile service in the United States (rather than the land mobile service), we propose to adopt new United States footnote USxxx that maintains this secondary mobile service allocation until the end of the transition period, and that otherwise parallels footnote 5.138A. Specifically, proposed footnote USxxx would read as follows:

> USxxx Until 29 March 2009, the band 6765-7000 kHz is allocated to the fixed service on a primary basis and to the mobile service on a secondary basis After this date, this band is allocated to the fixed and the mobile except aeronautical mobile (R) services on a primary basis

27. At the request of NTIA, we propose to upgrade the secondary mobile service allocation in the band 7400-8100 kHz to a primary mobile except aeronautical mobile (R) service allocation, upon the effective date of the Report and Order in this proceeding.[48] We note that many of the existing licenses in

[46] Footnote 5 143D reads as follows In Region 2, the band 7350-7400 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis After 29 March 2009, frequencies in this band may be used by stations in the above-mentioned services, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations

[47] Automatic and adaptive techniques have improved HF communications. In manual operation, the operator must adjust the parameters of the system for maximum performance The operator must monitor the conditions of the ionosphere, track the variable propagation conditions, and select the frequency that will allow the signal to propagate best. Because of the intensive labor required, HF communication was a prime candidate for use of automation and adaptive techniques. Present-day automation techniques reduce the burden on the HF operator by providing subsystems for frequency management, link establishment, link maintenance, *etc* Typically, automation can be added to make the radio appear to be "push-to-talk on the best channel," while actually the radio is a multichannel communication device performing many underlying functions Beyond these automation techniques are the "adaptive" techniques, which also can reduce the burden on the operator while making the radio more responsive to changing HF radio propagation conditions Thus, these techniques provide adaptivity that automatically alters operating parameters and/or system configuration in response to changes in the time-varying channel propagation conditions and external noise *See* http://www.its.bldrdoc.gov/pub/oa-rpt/hf-ale/handbook/chapter2.pdf

[48] In contrast, WRC-03 adopted the following schedule for upgrading the secondary land mobile service allocation to a primary mobile except aeronautical mobile (route) service allocation in the band 7400-8100 kHz. For the sub-band 7400-7450 kHz, the upgrade is effective January 1, 2005 in Region 2 For the sub-band 7450-8100 kHz, the upgrade is effective March 29, 2009 throughout the world (footnote 5 143E)

the band 7400-8100 kHz are for mobile service use and request comment on the effect of the proposed early upgrade on fixed service users, if any.[49]

28. Second, we propose to allocate the band 7350-7400 kHz to the broadcasting service on a primary basis, to adopt the Region 2 transition plan for the band 7350-7400 kHz as shown in footnote 5 143D; and to delete the table entries for the fixed and mobile service allocations from the band 7300-7400 kHz. Our proposal herein would provide international broadcasters with an additional 50 kilohertz of primary, exclusive spectrum in the band 7350-7400 kHz, effective March 29, 2009. While the band 7300-7350 MHz has previously been reallocated to the broadcasting service on a primary, exclusive basis, effective April 1, 2007, the table entries for the fixed and mobile service allocations were maintained at NTIA's request. As a consequence of our proposal to delete the table entries for the fixed and mobile service allocations from the band 7300-7350 kHz, we propose to provide for these allocations in a new United States footnote (USyyy) and to remove the frequency band from footnote US366. Specifically, we propose to revise footnote US366 and to add new footnote USyyy to read as follows:

> US366 On April 1, 2007, the bands 5900-5950 kHz, 9400-9500 kHz, 11600-11650 kHz, 12050-12100 kHz, 13570-13600 kHz, 13800-13870 kHz, 15600-15800 kHz, 17480-17550 kHz, and 18900-19020 kHz shall be allocated exclusively to the broadcasting service. After April 1, 2007, frequencies in these bands may be used by stations in the fixed and mobile services, communicating only within the United States and its insular areas, on the condition that harmful interference is not caused to the broadcasting service When using frequencies for fixed and mobile services, licensees shall be limited to the minimum power needed to achieve communications and shall take account of the seasonal use of frequencies by the broadcasting service published in accordance with Article 12 of the ITU Radio Regulations
>
> USyyy The band 7300-7350 kHz is allocated, until April 1, 2007, to the fixed service on a primary basis and to the mobile service on a secondary basis After April 1, 2007, frequencies in that band may be used by stations in the fixed and mobile services, communicating only within the United States and its insular areas, on the condition that harmful interference is not caused to the broadcasting service When using frequencies for fixed and mobile services, licensees shall be limited to the minimum power needed to achieve communications and shall take account of the seasonal use of frequencies by the broadcasting service published in accordance with Article 12 of the ITU Radio Regulations.

29. We also propose to cease issuing licenses for new non-Federal Government stations in the fixed and mobile services in the band 7350-7400 kHz as of March 29, 2009, consistent with the proposed allocation changes for these services. We anticipate that these requirements can be met in other HF bands allocated to the fixed and mobile services

30 The band 7100-7300 kHz is allocated to the amateur service on primary, exclusive basis in Region 2. We note that WRC-03 allocated the band 7100-7200 kHz to the amateur service in Regions 1 and 3 on a co-primary basis with the broadcasting service, effective January 1, 2005. After March 29, 2009, the band 7100-7200 kHz is allocated to the amateur service on an exclusive basis throughout the world, except in certain Region 1 and 3 countries.[50] As such, amateur service use of this 100 kilohertz will be on a *de facto* secondary basis in Regions 1 and 3 until the broadcasting service vacates the band

[49] On January 15, 2004, FCC staff reviewed non-Federal Government use of the band 7400-8100 kHz using the Universal Licensing System (ULS) At that time, there were 668 licenses: 403 conventional Public Safety Pool (PW), 116 conventional Industrial/Business Pool (IG), 111 Alaska Group (MK), 27 Coastal Group (MC), and 11 Aviation Auxiliary Group (AF).

[50] The band 7100-7200 kHz will remain allocated to the fixed and mobile except aeronautical mobile (route) service on a co-primary basis with the amateur service in the countries listed in footnote 5.141B

7100-7200 kHz at the conclusion of Schedule B in 2009 [51] This means that amateur stations in Regions 1 and 3 will shortly be permitted to transmit in the band 7100-7200 kHz, if they can find a frequency that is not being used by an international broadcast station. Currently, amateur stations in Regions 1 and 3 use the segment 7075-7100 kHz for phone emissions. The Commission authorizes amateur stations to transmit phone emissions in the segment 7150-7300 kHz. Together, these segments are used by amateur stations for full duplex operations when communicating between Region 2 countries and Regions 1 and 3 countries.[52] We anticipate that administrations in Regions 1 and 3 will in the near future authorize phone emissions in the segment 7150-7200 kHz, and we note the ARRL has requested that the frequency segment for phone emissions be expanded to 7125-7300 kHz.[53] These changes, if implemented, would permit half duplex operations, that is, amateur stations would be able to transmit and receive on a single frequency If this occurs, spectrum efficiency would be increased.

31. Until administrations in Regions 1 and 3 implement changes allowing amateur stations to transmit in the band 7100-7200 kHz, we believe that Sections 97.301 and 97 305 of our Rules need not be updated.[54] As a practical matter, we do not believe that the amateur service can make use of the band 7100-7200 kHz in Regions 1 and 3 in advance of HFBC stations vacating the band because of the great power disparity between amateur stations and international broadcast stations. Table 2, below, summarizes the 7 MHz realignment and our proposals for domestic implementation. We request comment on these proposals.

[51] Schedule B is the last Sunday in October to the last Sunday in March. (Schedule A is the last Sunday in March to the last Sunday in October) *See* ITU *Radio Regulations*, Article 12 (Seasonal planning in the HF bands allocated to the broadcasting service between 5900 kHz and 26100 kHz), Nos. 12.17 and 12.18.

[52] 47 C.F.R. § 97.305 (Authorized emission types), in particular paragraph (c).

[53] *See* American Radio Relay League, Inc., Petition for Rulemaking (filed Mar. 22, 2002) at 25. The ARRL's petition will be addressed in another proceeding.

[54] Section 97 301 of our Rules authorizes frequency bands to amateur stations located within 50 km of the Earth's surface, within the specified ITU Region, and outside any area where the amateur service is regulated by any authority other than the FCC 47 C.F.R § 97.301 (Authorized frequency bands) Section 97.305 of our Rules currently authorizes RTTY and data emissions in the segment 7000-7150 kHz and phone and image emissions in the segments 7075-7100 kHz and 7150-7300 kHz 47 C F R § 97.305(c) The Commission does not regulate communications at any location in Region 1, except for amateur stations located on ships on the high seas. In Region 3, the Commission regulates amateur stations located on Guam, the Northern Mariana Islands, American Samoa, and other smaller insular areas, in addition to stations on the high seas 47 C.F.R. § 2.106(a).

Table 2: Realignment in the Frequency Range 6765-8100 kHz (Some international footnotes that do not apply to Region 2 are not shown)

Band (kHz)	International Allocations Prior to WRC-03	Existing U S Allocations	International Allocations as Revised at WRC-03	Proposed U S Allocations	Remarks
6765-7000	FIXED Land mobile 5 138 (6765-6795 kHz is designated for ISM applications)	FIXED Mobile 5 138 US340 (2-30 MHz is available on a non-interference basis (NIB) for measuring reception quality)	FIXED MOBILE except aeronautical mobile (R) 5 138A (This allocation does not become effective until March 29, 2009, until then, the more limited secondary land mobile service allocation remains in effect) 5 138	FIXED MOBILE except aeronautical mobile (R) 5 138 US340 USxxx (parallels 5 138A, except that mobile service, not land mobile service, is maintained until phase-in date)	Effective March 29 2009, upgrade the secondary mobile service in 235 kilohertz to primary mobile except aeronautical mobile (R) service
7000-7100	AMATEUR AMATEUR-SATELLITE	AMATEUR AMATEUR-SATELLITE US340	AMATEUR AMATEUR-SATELLITE	AMATEUR AMATEUR-SATELLITE US340	No change
7100-7300	7100-7300 *In Region 2* AMATEUR 5 142 (Amateur use of 7100-7300 kHz in Region 2 must not impose constraints on Regions 1 & 3 HFBC) *In Regions 1 & 3* BROADCASTING	AMATEUR 5 142 US340	7100-7200 AMATEUR 5 142 (Until March 29, 2009, amateur use of 7100-7300 kHz in Region 2 must not impose constraints on Regions 1 & 3 HFBC After that date, amateur use of 7200-7300 kHz in Region 2 shall not impose constraints on Regions 1 & 3 HFBC) 5 141C (In Regions 1 & 3, this band is allocated to broadcasting on a primary basis until March 29, 2009) 7200-7300 kHz *In Region 2* AMATEUR 5 142 *In Regions 1 & 3* BROADCASTING	AMATEUR 5 142 US340	No change
7300-7350	BROADCASTING 5 134 (The use of the HFBC bands, including the band 7300-7350 kHz, is limited to single-sideband or digital emissions) 5 143 (Until 1 April 2007, 7300-7350 kHz is allocated to the fixed service on a primary basis and to the land mobile service on a secondary basis Afterwards, fixed and land mobile use is on an NIB basis to broadcasting)	BROADCASTING FIXED Mobile US340 US366 (On April 1, 2007, the WARC-92 HFBC bands are allocated exclusively to HFBC Afterwards, fixed & mobile use must not cause harmful interference to HFBC)	7300-7400 kHz BROADCASTING 5 134 (Administrations are urged to use the HFBC bands to facilitate the introduction of digitally modulated emissions) 5 143 5 143A & 5 143B (In Regions 1 & 3, 7350-7400 kHz is allocated, until March 29, 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis) 5 143D (In Region 2, 7350-7400 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis & to the land mobile service on a secondary basis After that date, fixed & mobile use must not cause harmful interference to HFBC	7300-7400 kHz BROADCASTING 5 134 5 143D US340 USyyy	Immediately allocate the band 7350-7400 kHz to HFBC, but until March 29, 2009, this 50 kilohertz will remain available for primary fixed & secondary land mobile use Continued fixed & land mobile use within the U S and its insular areas will be permitted on an NIB basis to HFBC
7350-8100	FIXED Land mobile	FIXED Mobile US340	7400-7450 kHz *In Region 2* FIXED and MOBILE except aeronautical mobile (R) *In Regions 1 & 3* BROADCASTING 7450-8100 FIXED MOBILE except aeronautical mobile (R) 5 143E (Does not become effective until March 29, 2009, until then the more limited secondary land mobile service allocation remains in effect)	7400-8100 kHz FIXED MOBILE except aeronautical mobile (R) US340	In 700 kilohertz, immediate upgrade from secondary mobile service allocation to primary mobile except aeronautical mobile (R) service

C Space Radiocommunication Services

32 In the following paragraphs, we discuss proposals for several of the space radiocommunication services, which are defined as any radiocommunication involving the use of one or more space stations or the use of one or more reflecting satellites or other objects in space.[55] These proposals include.

- SRS uplinks in the band 7145-7235 MHz; and wideband SRS downlinks in the bands 14.8-15.35 GHz and 25.5-27 GHz. The SRS is a radiocommunication service in which spacecraft or other objects in space are used for scientific purposes.[56]
- EESS downlinks in the band 25.5-27 GHz. The EESS is a radiocommunication service between earth stations and one or more space stations, which may include links between space stations, in which: (1) information relating to the characteristics of the Earth and its natural phenomena, including data relating to the state of the environment, is obtained from active sensors or passive sensors on Earth satellites; (2) similar information is collected from airborne or Earth-based platforms; (3) such information may be distributed to earth stations in the system concerned; and (4) platform interrogation may be included. This service may include feeder links necessary for its operation.[57]
- ISS use of the band 25.25-27 5 GHz. The ISS is a radiocommunication service providing links between artificial satellites.[58]

Table 3, which is at the end of this section, gives an overview of our proposals for these space radiocommunication services.

1. SRS Uplinks at 7145-7235 MHz

33 *Background.* The band 7125-7235 MHz is allocated to the fixed and mobile services on a co-primary basis throughout the world. Prior to WRC-03, the band 7145-7235 MHz was also allocated for SRS uplinks on a primary basis by footnote 5.460, which restricted the segment 7145-7190 MHz to deep space use and prohibited deep space communications in the segment 7190-7235 MHz.[59] Passive microwave sensor measurements may be carried out in the band 7125-7235 MHz.[60]

34 In the United States, the band 7125-7235 MHz is primarily used by the Federal Government and is allocated to the fixed service on a primary basis.[61] The sub-band 7125-7155 MHz is also allocated to the space operation service (Earth-to-space) for Federal Government use at no more than two sites;[62]

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[55] 47 C.F R § 2 1

[56] *Id*

[57] *Id*

[58] *Id*

[59] 47 C.F.R. § 2.106, footnote 5.460.

[60] Footnote 5.458 also states that administrations should bear in mind the needs of the EESS (passive) and the SRS (passive) in their future planning of the band 7125-7250 MHz. 47 C.F.R § 2.106, footnote 5.458.

[61] The band 7125-7235 MHz is part of a larger band that extends up to 8500 MHz, which is used for fixed point-to-point microwave links associated with many Federal agencies' missions including the DOD's national and military test range communications, and the "remoting" of data for such functions as air traffic control radar, weather, vessel traffic information, power management, *etc* *See* Federal Long-Range Spectrum Plan, Plan for Federal Use of the Radio Frequency Spectrum from 1300 to 10,000 MHz at http //www.ntia.doc.gov/osmhome/LRSP/LRSP5b.htm.

[62] 47 C.F.R § 2 106, footnote G116 The space operation service is a radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry, and space telecommand. (continued. .)

and the sub-band 7190-7235 MHz is allocated to the SRS (Earth-to-space) on a primary basis for Federal Government use In addition, Federal and non-Federal Government entities may carry out passive microwave measurements in the band 7125-7235 MHz.[63] The sub-band 7145-7190 MHz is also allocated for Federal and non-Federal Government SRS uplink use at NASA's deep space facility in Goldstone, California by footnote US252.[64] Staff review of the Commission's licensing database does not show any activity with regard to the band 7145-7190 MHz, that is, it appears that this spectrum has not been used by any non-Federal Government entity.

35. At WRC-03, the SRS uplink allocation in the band 7145-7235 MHz, which had been in footnote 5.460, was moved up as a table entry.[65] Footnote 5 460 was revised to delete the SRS allocation and to state that geostationary SRS satellites operating in the band 7190-7235 MHz may not claim protection from existing and future stations of the fixed and mobile services.[66]

36. The United States had requested these changes at WRC-03 in order to incorporate as a table entry in the ITU Table of Frequency Allocations the existing primary SRS allocation in the band 7145-7235 MHz in footnote 5.460.[67] This uplink allocation is used with the primary SRS downlink allocation in the band 8400-8500 MHz, which is already shown as a table entry. These bands are used on a worldwide basis for "cross support" in accordance with international agreements between a number of space agencies.[68]

37. NTIA recommends that the WRC-03 allocation changes in the 7 GHz frequency range be implemented in the U.S Table, except that the limitation to deep space communications be shown as part of the table entry for the SRS uplink allocation in the band 7145-7190 MHz, that is, the allocation read as follows. "SPACE RESEARCH (deep space) (Earth-to-space)." Because this table entry would contain part of the information from footnote 5.460, NTIA requests that the pertinent part of the international footnote be retained as a Federal Government footnote (Gyyy). Furthermore, because the band

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(.continued from previous page)
Note: These functions will normally be provided within the service in which the space station is operating.
47 C F.R § 2.1

[63] That is, international footnote 5.458, which is described in paragraph 33 above, has been adopted domestically NASA participates in remote microwave scanning measurements made over oceans for oceanographic studies/ research. *See* Federal Long-Range Spectrum Plan

[64] 47 C F.R § 2.106, footnote US252

[65] Prior to WRC-03, the international allocations extended from 7075-7250 MHz. In order to allocate just a segment of the band 7075-7250 MHz to the SRS, this larger band was subdivided into the bands 7075-7145 MHz, 7145-7235 MHz, and 7235-7250 MHz.

[66] Modified footnote 5 460 reads as follows "The use of the band 7145-7190 MHz by the space research service (Earth-to-space) is restricted to deep space, no emissions to deep space shall be effected in the band 7190-7235 MHz. Geostationary satellites in the space research service operating in the band 7190-7235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. 5.43A does not apply " ITU Radio Regulation No 5.43A states that if a service may operate in a specific frequency band subject to not claiming protection from another service, this means also that the service shall not cause harmful interference to the other service.

[67] *See U S Proposals for WRC-03*, Proposal B (Agenda Item 1.12) at page 50-51.

[68] Cross support means that space agencies share resources For example, there are orbits in which a satellite is not visible from a space agency's own earth stations, but which are visible to another agency's earth stations By sharing resources, space agencies do not have to store data onboard the satellite, and instead have immediate access to the data. *See e g* http.//projects.osd.noaa.gov/IJPS/communication.htm.

7145-7190 MHz is primarily a Federal Government band and because there are no known non-Federal Government requirements for deep space communications, NTIA did not recommend a table entry for non-Federal Government access to the NASA deep space facility at Goldstone. NTIA states that NASA's deep space facility at Goldstone has never been leased by a non-Federal Government licensee for deep space communications, and that non-Federal Government entities have not identified any requirements at Goldstone. Therefore, NTIA submits that non-Federal Government access to Goldstone should be downgraded to secondary status and be maintained as a footnote allocation. Accordingly, NTIA recommends that footnotes US252 and US262 be revised and that a new Federal Government footnote (Gyyy) be added to read as follows

> US252 The band 2110-2120 MHz is also allocated to the space research service (deep space) (Earth-to-space) on a primary basis at Goldstone, California.[69]
>
> US262 The band 7145-7190 MHz is also allocated to the space research service (deep space) (Earth-to-space) on a secondary basis for non-Federal Government use. The use of the bands 7145-7190 MHz and 34.2-34 7 GHz by the space research service (deep space) (Earth-to-space) and of the band 31.8-32 3 GHz by the space research service (deep space) (space-to-Earth) is limited to Goldstone, California
>
> Gyyy No emissions to deep space shall be effected in the band 7190-7235 MHz. Geostationary satellites in the space research service operating in the band 7190-7235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. 5.43A does not apply.

38. *Proposal* At the request of NTIA, we propose to move the SRS uplink allocation currently authorized in footnote US252 to a table entry in the Federal Government Table for the band 7145-7190 MHz.[70] NTIA prefers to highlight that SRS uplinks in the band 7145-7190 MHz are for deep space communications and does not believe that footnote 5.460 adequately highlights this important use We believe our proposal would adequately clarify that the band 7145-7190 MHz is allocated to the SRS (deep space) (Earth-to-space) on a primary basis for Federal Government use NTIA states that Federal Government SRS operations should be limited by adopting the remaining requirements in footnote 5.460 as footnote Gyyy. Accordingly, we propose to adopt footnote Gyyy, which would prohibit deep space communications in the band 7190-7235 MHz and which would specifically not require that stations in the fixed and mobile services protect geostationary SRS satellites. We believe that these actions are fully in accordance with the ITU *Radio Regulations*

39. With regard to the requested change in the allocation status for non-Federal Government SRS use of the Federal facility at Goldstone, we view this downgrade as having a minimal impact on future non-Federal Government users of the facility. That is, NTIA has coordinated the deep space facility at Goldstone in order to avoid interference problems with other Federal Government stations Therefore any non-Federal Government SRS use, if it ever develops, should be coincidentally protected We request comment on these proposals.

2. SRS at 14.8-15.35 GHz

40. *Background* The band 14.8-15 35 GHz is allocated to the fixed and mobile services on a co-primary basis and to the SRS on a secondary basis throughout the world. The sub-band

[69] Currently, footnote US252 applies to both the 2110-2120 MHz and 7145-7190 MHz. As a consequence of NTIA's recommendation to move the SRS uplink allocation for deep space communications in the band 7145-7190 MHz to footnote US262, footnote US252 would apply only to the band 2110-2120 MHz.

[70] In order to implement this proposal, we would subdivide the existing band 7125-7190 MHz in the Federal Government Table into the bands 7125-7145 MHz and 7145-7190 MHz.

15.2-15 35 GHz is also allocated to the SRS (passive) and EESS (passive) on a secondary basis throughout the world [71]

41. In the United States, the band 14.8-15.35 GHz is primarily allocated for Federal Government operations with only limited non-Federal Government use authorized through footnote allocations. In the Federal Government Table, the band 14.8-15 35 GHz is allocated in accordance with the international allocations described in the preceding paragraph, except that the segment 14.8-15.1365 MHz is allocated to the fixed service on a secondary basis and the segment 15.1365-15.35 GHz is allocated to the mobile service on a secondary basis.[72] Footnote US211 states that, in the band 15.1365-15.35 GHz, applicants for airborne or space station assignments are urged to protect RAS observations in the adjacent band 15.35-15 4 GHz from harmful interference.[73]

42. The principle SRS use of the band 14.8-15.35 GHz is by NASA's Tracking and Data Relay Satellite System (TDRSS), which is a communication signal relay system that provides tracking and data acquisition services between low earth orbiting (LEO) spacecraft and NASA/customer control and/or data processing facilities.[74] In the segment 15.2-15.35 GHz, NASA operates spacecraft VLBI phase uplinks, which are discussed below.[75]

43 The only non-Federal Government use permitted in the band 14.8-15.35 GHz is by footnote 5.339 for secondary SRS (passive) and EESS (passive) operations and by footnote US310 for low Earth orbiting satellite-to-TDRSS transmissions in the segment 14.896-15.121 GHz.[76] The Commission has never issued a license for SRS use under footnote US310.

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[71] 47 C.F.R. § 2.106, footnote 5.339.

[72] The band 14.8-15.35 is part of the larger band 14.7145-15.35 MHz Fixed and mobile microwave systems operate extensively in this band for various purposes that transmit video, audio, and data The military also operates fixed, mobile, and maritime mobile air-to-air and air-to-ground datalinks in this band (common data link).

[73] 47 C.F.R. § 2.106, footnote US211

[74] The TDRSS earth stations near Las Cruces, New Mexico and on Guam transmit in the segment 14.6-15.25 GHz to TDRSS satellites, which are located in the geostationary orbit. (The TDRSS satellites downlink in the band 13 4-14.05 GHz) The New Mexico site has two functionally identical earth stations collectively known as the White Sands Complex. NTIA has recently approved a future TDRSS earth station that will be located in Virginia at either NASA's Wallops Island Space Flight Center or NASA's Langley Space Flight Center. In addition, user satellites in low Earth orbit transmit up to TDRSS satellites in the segment 14.8909-15.1159 GHz (Ku-band single access return link). (TDRSS transmits down to user satellites in low Earth orbit in the band 13 75-13.8 GHz (Ku-band single access forward link).) The Terra spacecraft downloads its data to TDRSS in the segment 14 7145-15.1365 GHz. The five sensors aboard Terra are comprehensively measuring our world's climate system--to observe and measure how Earth's atmosphere, cryosphere, lands, oceans, and life all interact. Data from this mission are used in many research and commercial applications. Terra is a vital part of NASA's Earth Science Enterprise, helping us understand and protect our home planet. *See* http://terra.nasa.gov/.

[75] *See* Federal Long-Range Spectrum Plan, Plan for Federal Use of the Radio Frequency Spectrum from 10 to 100 GHz

[76] 47 C F.R. § 2.106, footnote US310, which reads as follows: In the band 14.896-15.121 GHz, non-Federal Government space stations in the space research service may be authorized on a secondary basis to transmit to Tracking and Data Relay Satellites subject to such conditions as may be applied on a case-by-case basis. Such transmissions shall not cause harmful interference to authorized Federal Government stations. The power flux-density produced by such non-Federal Government stations at the Earth's surface in any 4 kHz band for all conditions and methods of modulation shall not exceed:

-148 dB(W/m^2) for $0° < \theta \leq 5°$

$-148 + (\theta - 5)/2$ dB(W/m^2) for $5° < \theta \leq 25°$

(continued .)

44 At WRC-03, the United States requested that the secondary SRS allocation in the band 14 8-15.35 GHz be upgraded to primary status in order to satisfy requirements for high data rate space science missions [77] ITU-R studies have shown that the band 14 8-15.35 GHz is suitable for a primary allocation to satisfy these requirements The band is most desirable for high data rate SRS missions operating in low-to-mid inclination orbits, geostationary orbits, and the L1/L2 libration points due to the possible sharing of ground station resources located at low-to-mid latitude Deep Space Network (DSN) and National Radio Astronomy Observatory (NRAO) sites ITU-R studies also demonstrated the feasibility of sharing between the SRS and other services currently allocated on a primary basis in the 14 8-15.35 GHz band. With respect to coordination and notification procedures, the current provisions of Articles 9 and 11 and the proposed sharing criteria would continue to apply among the SRS, fixed, and mobile services in the band 14.8-15.35 GHz. Nevertheless, WRC-03 did not upgrade the secondary SRS allocation in the band 14.8-15.35 GHz to primary status because fixed service users were opposed to this change.

45. In the band 14.8-15.35 GHz, NTIA recommends that the secondary SRS allocation be upgraded to primary status for Federal Government use. NTIA makes this recommendation because (1) TDRSS and other SRS operations support vital national interests and warrant primary status, and (2) studies and operational experience undisputedly show that SRS operations can share with existing services.

46. In addition, NTIA recommends that footnote US310 be revised by using a one megahertz reference bandwidth (instead of the current four kilohertz reference bandwidth) and by correspondingly increasing the power flux-density (pfd) limit by 24 dB. In its request to NTIA for this change, NASA states that the pfd reference bandwidth listed in footnote US310 should be updated to one megahertz in order to correct an error in the *NTIA Manual* and to more appropriately reflect the change from analog to digital transmissions.

47. *Proposal* As requested by NTIA, we propose to upgrade the secondary SRS allocation in the band 14.8-15.35 GHz to primary status for Federal Government use, except that SRS (passive) use of the segment 15.2-15 35 GHz would retain secondary status.[78] We tentatively find that the upgrade is in the national interest. Specifically, the United States has developed extensive SRS operations in this band at great expense and these operations merit the protection that a primary allocation provides. However, since this primary SRS allocation would be in derogation of the ITU *Radio Regulations*, we note that, for example, Federal Government SRS receive earth stations would not be protected from stations in the fixed and mobile services operating in neighboring countries.

(.. continued from previous page)

-138 dB(W/m^2) for $25° < \theta \leq 90°$

where θ is the angle of arrival of the radio-frequency wave (degrees above the horizontal). These limits relate to the power flux-density and angles of arrival which would be obtained under free-space propagation conditions

[77] *See U S Proposals for WRC-03*, Proposal C (Agenda Item 1.12), at pages 51-52. Spacecraft for these missions will carry telescopes to conduct sky surveys or Space Very Long Baseline Interferometry (SVLBI) observations. They may also carry other passive instruments to measure phenomenon such as the Earth's magnetosphere and solar flares These missions will be limited in number and will generally be in a polar or equatorial orbit, with some at geostationary altitudes, highly elliptical orbit; or at the L1 or L2 Sun/Earth equilibrium libration points that are approximately 1 9 million kilometers from Earth

[78] The table entry for the SRS allocation would not be limited and thus, SRS uplinks, SRS downlinks, SRS (active), and SRS (passive) operations would be allowed on a primary basis in the band 14.8-15.35 GHz, except in the segment 15 2-15 35 GHz where footnote 5 339 would limit SRS (passive) use to secondary status

48. In addition, we propose to revise footnote US310 by using a reference bandwidth that is more appropriate for today's digital transmissions than a reference bandwidth based on an analog channel We request comment on these proposals.

3 SRS and EESS Downlinks at 25.5-27 GHz and ISS at 25.25-27.5 GHz

49. *Background.* The band 25.25-27.5 GHz is allocated to the fixed, mobile, and ISS services on a primary basis throughout the world. ISS use of the 25.25-27.5 GHz band is limited by footnote 5.536 to SRS and EESS applications, and also transmissions of data originating from industrial and medical activities in space.[79] The band 25.25-27 GHz is also allocated to the standard frequency and time signal-satellite (Earth-to-space) on a secondary basis throughout the world. Further, the band 25.5-27 GHz is allocated to the EESS (space-to-Earth) on a primary basis throughout the world. Footnote 5.536A states that administrations installing EESS earth stations cannot claim protection from stations in the fixed and mobile services operated by neighboring administrations.[80] The band 27-27.5 GHz is allocated to the fixed-satellite service (FSS) (Earth-to-space) on a primary basis in Regions 2 and 3. Footnote 5.537 states that space services using non-geostationary (NGSO) satellites operating in the ISS in the band 27-27.5 GHz are exempt from the general provision that NGSO satellite systems must not cause unacceptable interference to geostationary-satellite systems in the FSS and the broadcasting-satellite service[81]

50 In the United States, the band 25.5-27 GHz is Federal/non-Federal Government shared spectrum that is primarily used by Federal agencies. All of the international allocations described in the preceding paragraph have been adopted in the Federal Government Table, except for the FSS uplink allocation.[82] NASA has three geostationary TDRSS space stations in orbit that currently have the capability to receive transmissions in the band 25.25-27 GHz from low Earth-orbiting satellites.[83] In the future, NASA expects to use TDRSS space stations extensively to satisfy SRS and EESS wide bandwidth data requirements that cannot be satisfied in the band 14.896-15.121 GHz Additionally, there are currently two new systems under development that will operate in the band 25.5-27 GHz. Specifically, NASA is developing a geostationary Solar Dynamics Observatory (SDO) system that will downlink SRS data to White Sands, New Mexico and the National Oceanic and Atmospheric Administration (NOAA) is developing a non-geostationary National Polar-orbiting Operational Environmental Satellite System (NPOESS) that will downlink EESS data to a limited number of earth stations. Finally, NASA and NOAA expect to build additional wide bandwidth EESS systems in this band.

51. In the non-Federal Government Table, the band 25.25-27.5 GHz is allocated to the EESS (space-to-space) on a secondary basis; the segment 25.25-27 GHz is allocated to the standard frequency

[79] 47 C.F.R § 2.106, footnote 5.536.

[80] 47 C.F R. § 2.106, footnote 5.536A This footnote also states that EESS earth stations should take into account Recommendation ITU-R SA.1278. In addition, footnote 5.536B states that, in certain countries (including only Brazil in Region 2), EESS earth stations in the band 25.5-27 GHz cannot constrain the use and deployment of stations in the fixed and mobile services. 47 C.F.R § 2 106, footnote 5.536B.

[81] 47 C.F.R. § 2 106, footnote 5.537 *See* ITU *Radio Regulations*, Article 22, No. 22.2.

[82] The band 25 5-27 GHz is used for low density fixed point-to-point links for voice, data, and video at government laboratories and test ranges. The band 25.25-27 GHz is a possible future band for flight test telemetry

[83] TDRSS satellites transmit down to LEO satellites in the band 22.55-23 55 GHz.

and time signal-satellite (Earth-to-space) on a secondary basis, and the segment 25 5-27 GHz is allocated to the EESS (space-to-Earth) on a secondary basis.[84]

52. At WRC-03, the United States requested that the band 25.5-27 GHz (26 GHz) be allocated to the SRS (space-to-Earth) in order to satisfy requirements for high data rate space science missions.[85] ITU-R studies have shown that the 26 GHz band is suitable for a primary SRS allocation to satisfy these requirements. The 26 GHz band is most desirable for high data rate SRS missions operating in high inclination orbits due to the possible sharing of ground station resources with EESS missions operating in that band Sharing of ground station resources can result in substantial cost and schedule benefits for international space agencies implementing high rate SRS missions. The 26 GHz band also affords SRS missions the flexibility of using a wide bandwidth space-to-space link in an existing or planned data relay satellite network as well as wide bandwidth downlinks. The United States also proposed that administrations operating SRS earth stations in the band 25.5-27 GHz not be able to claim protection from stations in the fixed and mobile services operated by other administrations, that is, that footnote 5 536A be revised to apply to the SRS as well as the EESS.

53. WRC-03 allocated the band 25.5-27 GHz for SRS downlinks on a primary basis. WRC-03 also revised footnote 5 536A to apply to both SRS and EESS earth stations. Specifically, footnote 5.536A was revised to read as follows:

> 5 536A Administrations operating earth stations in the Earth exploration-satellite service or the space research service shall not claim protection from stations in the fixed and mobile services operated by other administrations In addition, earth stations in the Earth exploration-satellite service or in the space research service should be operated taking into account Recommendations ITU-R SA 1278 and ITU-R SA.1625, respectively

54. Finally, WRC-03 added SRS to list of space radiocommunication services in Article 21 of the ITU *Radio Regulations* that must adhere to maximum pfd limits ("hard limits") in the band 25.25-27.5 GHz.[86] Therefore, the pfd in dB(W/m^2) for angles of arrival (δ) above the horizontal plane at the Earth's surface produced by emissions from EESS and SRS space stations in the band 25.5-27 GHz and from ISS space stations in the band 25.25-27.5 GHz for all conditions and for all methods of modulation must not exceed:

$$\begin{aligned} &-115 && \text{for } 0° \le \delta \le 5° \\ &-115 + 0.5(\delta - 5) && \text{for } 5° \le \delta \le 25° \end{aligned}$$

[84] In a recent rule making, we raised the secondary EESS (space-to-Earth) allocation in the band 25.5-27 GHz to primary status for Federal Government use, but maintained secondary status for non-Federal Government use. *Above 28 MHz R&O* at paras 53-56. In response to the requests of two commercial remote sensing operators (DigitalGlobe, Inc. and Space Imaging L L C.) for a similar non-Federal upgrade, we have had discussion with NTIA and have been able to reach an agreement on this matter. See para. 55, below, wherein NTIA proposes a primary EESS (space-to-Earth) allocation for non-Federal Government use.

[85] In support of this request, the United States stated the following. Resolution 723 (Rev. WRC-2000) *resolves 4,* recommended that WRC-03 consider a review of the existing SRS allocation near 26 GHz, with a view to accommodating wideband SRS downlink applications. This *resolves* is in response to a need for allocations to support planned high data rate SRS missions requiring bandwidths up to 400 megahertz. Spacecraft for these missions will carry telescopes to conduct sky surveys or SVLBI observations. They may also carry other passive instruments to measure phenomenon such as the Earth's magnetosphere and solar flares. These missions will be limited in number and will generally be in a polar or equatorial orbit, with some at geostationary altitudes; highly elliptical orbit, or at the L1 or L2 Sun/Earth equilibrium libration points that are approximately 1.9 million kilometers from Earth *See U S Proposals for WRC-03*, Proposal C (Agenda Item 1.12), at pages 51-52.

[86] *See* ITU *Radio Regulations* at Article 21 (Terrestrial and space services sharing frequency bands above 1 GHz), Section V (Limits of power flux-density from space stations), No. 21.16 and Table 21-4.

-105 for $25° \leq \delta \leq 90°$

These limits relate to the pfd which would be obtained under assumed free-space propagation conditions The reference bandwidth is 1 MHz.[87]

55 NTIA recommends that the band 25 5-27 GHz be allocated to the SRS (space-to-Earth) on a primary basis for Federal Government use.[88] In addition, NTIA recommends that the secondary non-Federal Government allocation for the EESS (space-to-Earth) be upgraded to primary status Specifically, NTIA recommends that the table entry for the EESS (space-to-Earth) allocation be deleted and that footnote US258 be revised to read as follows:

> US258 In the bands 8025-8400 MHz and 25 5-27 GHz, the Earth exploration-satellite service (space-to-Earth) is allocated on a primary basis for non-Federal Government use. Authorizations are subject to a case-by-case electromagnetic compatibility analysis.

NTIA also recommends that footnote 5.536A be added to the non-Federal Government Table.

56 NTIA also recommends that the secondary non-Federal Government allocation for the EESS (space-to-space) in the band 25.25-27.5 GHz be broadened to a secondary ISS allocation. NTIA further recommends that international footnote 5.536 be added to the non-Federal Government Table, thereby limiting the use of this ISS allocation to SRS and EESS applications, and also to transmissions of data originating from industrial and medical activities in space.

57. On September 25, 2003, NTIA commented in ET Docket 02-305 concerning the band 25.5-27 GHz, which it characterized as being "very unique and important to [Federal] Government agencies."[89] First, the band 25.25-27.5 GHz is currently allocated on a primary basis only for Federal Government use. Second, the Federal Government will also be implementing EESS satellite systems in this spectrum, *e.g*, TDRSS already has the capability and the Department of Commerce has submitted plans for its National Polar-orbiting Operational Environmental Satellite System. NTIA states that any non-Federal Government EESS system would need to coordinate with these Federal operations. NTIA also noted that at WRC-03 the United States negotiated a primary SRS (downlink) allocation in the band 25.5-27 GHz based on Federal Government requirements

58. As a result of the normal IRAC coordination process, NTIA provided additional information on sharing requirements for the band 25.5-27 GHz. Specifically, NTIA stated that within the North Atlantic Treaty Organization (NATO), the band 26.5-27.5 GHz is a harmonized band for terrestrial operations. In order to protect Federal Government terrestrial receivers, NTIA requests that non-Federal EESS downlinks operating in the band 25.5-27 GHz meet the pfd limits contained in Article 21 of the Radio Regulations, which are shown in paragraph 54, above.

59. NTIA also states that it is important to ensure that non-Federal Government receiving EESS earth stations are implemented in the band 25.5-27 GHz in such a way that they do not unduly constrain the future use of this band by Federal Government stations in the fixed and mobile services. Therefore, NTIA requests that the Commission seek comment from potential EESS applicants as to whether the following constraints would be helpful in fostering compatibility in the band 25.5-27 GHz: (1) A limitation on the number of U.S. earth stations for any non-Federal Government EESS system (*e.g.*, four earth stations) that uses this band; (2) A requirement that non-Federal Government spacecraft using the

[87] *See WRC-03 Final Acts* at Article 21, Section V, Table 21-4

[88] *See* NTIA WRC-03 Recommendations, Enclosure 1 at Agenda Item 1.12 and Enclosure 2 at p 34.

[89] *See* letter from Fredrick R. Wentland, Associate Administrator, Office of Spectrum Management, NTIA, to Edmond J Thomas, Chief, Office of Engineering Technology, FCC, dated September 25, 2003

band turn off their transmitters when not in view of a receiving earth station. This requirement could be implemented either for all cases or for those cases where the spacecraft transmission bandwidth is greater than some to-be-determined minimum value in megahertz, and (3) the pfd at the geostationary orbit from a non-Federal Government EESS system be limited to the values indicated in Recommendation ITU-R SA 1278 to protect TDRSS reception from low Earth-orbiting user spacecraft.[90] Specifically, the ITU values are as follows: (1) EESS satellites in sun-synchronous orbit or in an orbit that is proximate to the orbits of the TDRSS user satellites shall not produce a pfd greater than -155 dB(W/m²) in 1 MHz at any location on the geostationary orbit (GSO) for more than 0 1% of the time; and (2) EESS satellites in orbits other than that mentioned above shall not produce a pfd greater than -155 dB(W/m²) in 1 MHz at any location on the GSO for more than 1% of the time.[91] In order to protect Federal Government operations, NTIA stated that it may subsequently request that certain requirements, including those mentioned above, be contained either in a United States footnote or in the Commission's service rules.

60. *Proposal* We propose to upgrade the secondary non-Federal Government allocation for EESS downlinks in the band 25.5-27 GHz to primary status We believe that this upgrade is necessary to meet the requirements of the commercial remote sensing industry and is consistent with the Fact Sheet on U S. Commercial Remote Sensing Policy that was released by the White House on April 25, 2003.[92] Specifically, we propose to revise footnote US258 to include the band 25.5-27 GHz in its text, to add footnote US258 to the non-Federal Government Table in the band 25.5-27 GHz, and consequently to delete the table entry for the secondary EESS downlink allocation from the non-Federal Government Table

61. By adding the band 25.5-27 GHz to footnote US258, we would also subject each non-Federal Government authorization to a case-by-case electromagnetic compatibility (EMC) analysis. Because of existing and planned Federal Government SRS and EESS requirements in the band 25.5-27 GHz, which are discussed above, we believe that it is important that non-Federal Government EESS downlinks operated in this band be designed to ensure compatibility with Federal Government systems We also propose to add footnote 5.536A to the non-Federal Government Table in the band 25.5-27 GHz. This action would provide guidance to earth station applicants, *e g.*, Annex 1 provides a methodology for estimating needed separation distances between EESS earth stations and fixed stations,[93] and would better alert commercial remote sensing operators of the EESS downlink allocation's status in border areas, *i.e.*, where possible, these operators should consider placing their receive earth stations away from border areas.

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[90] *See* Recommendation ITU-R SA.1278 titled "Feasibility of Sharing between Earth Exploration-Satellite Service (space-to-Earth) and the fixed, inter-satellite, and mobile services in the band 25.5-27.0 GHz," at http://www itu.int/rec/recommendation.asp?type=items&lang=e&parent=R-REC-SA.1278-0-199710-I.

[91] *See* Recommendation ITU-R SA.1278, *recommends* 3

[92] *See* Fact Sheet at http //www.fas.org/irp/offdocs/nspd/remsens.html. This document states the fundamental goal of this national policy is to "advance and protect U.S. national security and foreign policy interests by maintaining the nation's leadership in remote sensing space activities, and by sustaining and enhancing the U.S. remote sensing industry;" and further states that U.S companies are "encouraged to build and operate commercial remote sensing space systems whose operational capabilities, products and services are superior to any current or planned foreign commercial systems." We observe that first generation commercial remote sensing satellite systems use the band 8025-8400 MHz, but the U.S commercial remote sensing industry has identified the band 25.5-27 GHz for wider bandwidth operations

[93] *See* Recommendation ITU-R SA.1278, Annex 1 titled "Separation distances between EESS earth stations and FS stations around 26 GHz."

62 In order to protect Federal Government terrestrial receivers, we propose to require that non-Federal EESS space stations transmitting in the band 25.5-27 GHz meet the pfd limits contained in Article 21 of the ITU *Radio Regulations*. We would codify this requirement by adding these pfd limits to Part 25 of the Commission's Rules. Based on a request from NTIA, we seek comment from potential EESS applicants as to whether the constraints listed in paragraph 59, above, would be helpful in fostering compatibility between Federal and non-Federal Government systems.

63. We also propose to broaden the secondary non-Federal Government allocation for the EESS (space-to-space) in the band 25 25-27.5 GHz to a secondary ISS allocation However, we also propose to adopt footnote 5.536, which would limit the use of this ISS allocation to SRS and EESS applications, and also to transmissions of data originating from industrial and medical activities in space. This restriction is necessary to ensure that this frequency band meets the needs of the scientific community without being overtaken for FSS or MSS use. Nevertheless, we request comment on the need for this restriction. In order to protect Federal Government terrestrial receivers, we propose to require that non-Federal ISS space stations transmitting in the band 25.25-27.5 GHz meet the pfd limits contained in Article 21 of the ITU *Radio Regulations*. The ISS pfd requirements and the EESS pfd requirements are the same and would be shown once in Part 25 of the Commission's Rules.

64. We propose to allocate the band 25.5-27 GHz to the SRS (space-to-Earth) on a primary basis for Federal Government use. This action would provide a primary SRS allocation to satisfy Federal requirements for high data rate space science missions. We request comment on all of these proposals.

4. EESS (active) at 432-438 MHz

65 *Background.* The band 432-438 MHz is allocated to the radiolocation service on a primary basis throughout the world. The band 432-438 MHz is allocated to the amateur service on a primary basis in Region 1 and on a secondary basis in Regions 2 and 3, except as stated in country footnotes 5.272 and 5.278.[94] In the segment 435-438 MHz, the amateur-satellite service (AMSAT) may operate subject to not causing harmful interference to other services operating in accordance with the International Table (footnote 5.282) [95] In addition, there are several footnote allocations that pertain to this spectrum.[96]

66 In the United States, the band 432-438 MHz is allocated to the radiolocation service on a primary basis for Federal Government use. The use of the radiolocation service allocation is limited to the military services,[97] except that pulse-ranging and spread spectrum radiolocation systems may be authorized for Federal non-military and non-Federal Government use on a secondary basis along the shorelines of the 48 contiguous States and Alaska.[98] The band 432-438 MHz is allocated to the amateur service on a secondary basis.[99] International footnote 5.282 has been adopted domestically and thus, the

[94] As an exception to the Region 1 primary allocation for the amateur service, the amateur service in France is allocated on a secondary basis. As exceptions to the Region 2 secondary allocation, the amateur service in the countries listed in footnote 5 278 has primary status 47 C.F R. § 2.106, footnotes 5 272 and 5 278

[95] 47 C.F.R. § 2 106, footnote 5.282.

[96] 47 C.F.R. § 2 106, footnote 5.138 and 5.280 (In Region 1, ISM applications at 433.05-434.79 MHz), 5.271 (aeronautical radionavigation service), 5.276 and 5.277 (fixed service), 5.279 (In Mexico, primary land mobile service allocation in the segment 432-435 MHz); and 5.281 (space operation service).

[97] 47 C.F R. § 2 106, footnote G2.

[98] 47 C.F R. § 2 106, footnote US217

[99] In the areas listed in footnote US7, special conditions apply to use the amateur service allocation. 47 C.F.R. § 2.106, footnote US7

amateur-satellite service may operate in the segment 435-438 MHz subject to not causing harmful interference to other services operating in accordance with the International Table

67 At WRC-03, the band 432-438 MHz was allocated to the EESS (active) on a secondary basis throughout the world WRC-03 limited the use of this allocation through footnote 5.279A, which reads as follows:

> 5.279A The use of this band by sensors in the Earth exploration-satellite service (active) shall be in accordance with Recommendation ITU-R SA.1260-1. Additionally, the Earth exploration-satellite service (active) in the band 432-438 MHz shall not cause harmful interference to the aeronautical radionavigation service in China
>
> The provisions of this footnote in no way diminish the obligation of the Earth exploration-satellite service (active) to operate as a secondary service in accordance with Nos 5.29 and 5 30.

68. On February 20, 2004, NTIA addressed this EESS allocation in a letter to the Commission.[100] Specifically, NTIA noted that while the United States originally opposed the allocation, WRC-03 approved a worldwide secondary allocation for the EESS (active), which incorporates certain operational restrictions delineated in ITU-R SA 1260-1,[101] and NTIA now expects that foreign systems as well as NASA will want to operate under the allocation. Therefore, NTIA recommends that the Commission provide an allocation status under which the United States would authorize EESS (active) in the band.

69. NTIA states that ITU-Recommendation SA.1260-1 effectively limits the operational use of 432-438 MHz EESS to areas outside the United States. However, NASA has indicated a need to perform some limited pre-operational testing of its systems within line-of-sight of its U.S control stations. In order to account for the required use of the EESS allocation in the United States, a new US footnote is proposed. As EESS satellites within line-of-sight of the United States would operate solely for the purpose of short duration pre-operational testing, NTIA states that there will be minimal impact to any other services Therefore, NTIA recommends that the following United States footnote be proposed in order to clarify the allocation status of U.S authorized EESS:

> In the band 432-438 MHz, the Earth exploration-satellite service (active) is allocated on a secondary basis Stations in the Earth exploration-satellite service (active) shall not be operated within line-of-sight of United States except for the purpose of short duration pre-operational testing. Operations under this allocation shall not cause harmful interference to, nor claim protection from, the other services allocated in the band in the United States, including secondary services.

70. *Proposal.* After additional discussions with NTIA, we tentatively find that any secondary EESS (active) allocation in the band 432-438 MHz should be limited to Federal Government use and that this allocation should not cause harmful interference to, nor claim protection from, any other services allocated in the band in the United States, including the amateur-satellite service. Accordingly, we propose to adopt the following United States footnote:

> USzzz In the band 432-438 MHz, the Earth exploration-satellite service (active) is allocated on a secondary basis for Federal Government use. Stations in the Earth exploration-satellite service (active) shall not be operated within line-of-sight of United States except for the purpose of short duration pre-operational testing Operations under this allocation shall not cause harmful interference to, nor claim protection from, any other services allocated in the band 432-438 MHz in the United States, including secondary services and the amateur-satellite service.

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[100] *See* letter from Fredrick R. Wentland, Associate Administrator, Office of Spectrum Management, NTIA, to Edmond J. Thomas, Chief, OET, FCC, dated February 20, 2004

[101] *See* Draft Revision to Recommendation ITU-R SA.1260 titled "Feasibility of sharing between active spaceborne sensors and other services in the range 420-470 MHz," Document 7/BL/22-E, dated February 11, 2003.

The adoption of this footnote would permit NASA to perform limited pre-operational testing of its systems within line-of-sight of its U.S control stations, provided that it does not cause harmful interference to the radiolocation, amateur, and amateur-satellite services in the United States. We request comment on this proposal.

71. Table 3, below, gives an overview of our major proposals for the space radiocommunication services discussed in this section